

conductors without forming HCN polluting residues is taught by using a mixture of methylene bromopropionate and methylenedianiline in aliphatic solvents in the presence of a catalyst. The solvent is separated through distillation and filtration of the mother waters and purification through washing with water. The resulting product is mixed with cresyl acid and methylene diisocyanate in the presence of a triethylenediamino catalyzer, and is then heated and distilled to obtain a polyglycolyl urea hydantoin resin.

RESPONSE

This is in response to the Office Action of September 23, 2002.

The Office Action states that support has not been provided for the methylhaloester reactant or the 16 hour reflux time.

In response, applicants note that on page 3, it is stated that

“Stage A includes the following steps:

1) mixing the reaction solvents, **bromided ester**, diamine and catalyst;”

On page 5, it is stated:

“STAGE A

Obtainment of methyl diglycinate from
methylenedianiline

a) in a glass or stainless steel matrass, provided with

stirring means, reflux column, heating and cooling systems, the following materials are added: methylenedianiline, methanol and **methyl bromopropionate.**”

It is also noted on page 5 that

“Hereinafter Stage 2 is described, in which the halogen “chlorine” is substituted by “bromine” from the methyl propionate that gives better results in the removal of residual by-products.”

Methyl bromopropionate is a methyl haloester reactant. Combined with the reference to bromided ester, there is more than enough support to use the term “methyl haloester,” particularly since the line on page 5 suggests that a chlorine methyl haloester could be used in place of a bromided ester, albeit with results that are not as good as those obtained by the use of the bromided compounds.

As to the time of refluxing, claim 9 has been amended. Support for claim 9 is found on page 5.

Support for claim 6 is found on pages 3-11.

Support for claim 7 is found on page 5, line 2, wherein it is stated that bromine methyl propionate gives better results than chlorine methyl propionate. This line does not rule out the use of chlorine methyl propionate.

Support for claim 8 is found on page 5, stage A, paragraph a.

Support for Amended claim 9 (refluxing for 19 hours) is found on page 5, Stage A, paragraph c.

Support for claims 10 and 11 is found on page 5, Stage A, paragraph b.

Support for amended claim 12 is found on page 6, Stage B, paragraph j.

Support for claim 13 is found on page 5, Stage A, paragraph e.

Support for claim 14 is found on page 6, Stage B, paragraph j.

Support for claim 15 is found on page 6, Stage B, paragraph k.

Support for claim 16, is found on page 7, line 3.

Support for claim 17, is found on page 6, Stage B, paragraph j.

Support for claim 19, is found on page 6,, Stage B, paragraph k.

Support for claim 20 is found on page 7.

For claim 21, methanol is used in the application and is found on page Stage A, paragraph A.

However, original claim 1 specifically reacts a mixture of methyl bromopropionate and methylenedianiline in a C₁ - C₄ aliphatic solvent. This information can be incorporated into the main section of the specification, as the original claim is part of the specification.

Support for claim 22 is found on page 5, stage A, paragraph b.

Support for claim 23 corresponds to the stereoisomer described under stage B.

Support for claim 24 is found on page 6, the last paragraph of Stage A.

Support for claim 25 is found on pages 7 and 8.

The Office Action also notes that there are numerous inconsistencies and errors within the specification. The examiner notes that on page 3, applicants refer to the use of aromatic isocyanate; however, only the aliphatic diisocyanate, methylene diisocyanate, is exemplified. Further, applicants incorrectly refer to methylene diisocyanate as being an aromatic isocyanate in claim 12.

The Office Action also states that formula I in claim 6 and formula II in claim 23 are incorrect.

In response, applicants have corrected the figures. Applicant notes that the mistake in figure I was the result of a typographical error, and that it is obvious that it is a typographical error. Applicant notes that if one follows the reaction of the specified reactants, the hydantoin resin as now listed is obtained.

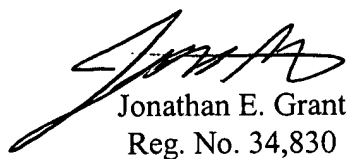
Further, the appropriate linkage for a hydantoin resin is between the nitrogen molecule in the hydantoin structure and the aromatic structure. It is obviously a mistake to show a molecule in this structure with a linkage between aromatic structures, and said mistake was made in an attempt to show the nature of the polymeric structure.

Applicants also note the case of *The Reagents of the University of New Mexico v. Galen D. Knight and Terence J. Scallen* (Fed. Cir., decided February 28, 2003). In that case, chemical structures in the CIP applications were incorrect, and the PTO accepted correction to new structures after a consultant found that the original structures were incorrect. The Federal Circuit accepted the correction, because "a chemical structure is simply a means of describing a compound; it is not the invention itself." The application had provided details of synthesis that lead to the different structure, allowing correction.

The Office Action also notes that the terms polyglycolyl urea and polyglycolyl urea hydantoin resin are used interchangeably. This has been corrected.

The application is now in condition for allowance. Please call or fax me at (301) 603-9071 if you have any questions or comments.

Respectfully submitted,



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CLEAN COPY OF THE CHANGES

In the specification:

Please amend the Page 2, line 19 as follows:

C¹ The applicant has developed a process to obtain polyglycolyl urea hydantoin from aromatic diglycinates, the main characteristic of which is that it does not form high risk polluting residual by-products such as HCN emission, obtaining a product that meets the main properties of such commercially available resins such as thermal, mechanical and chemical properties and even improving certain characteristics such as freon resistance of polyesterimide-type enameled products.

Please amend page 3, lines 4 and 6 as follows:

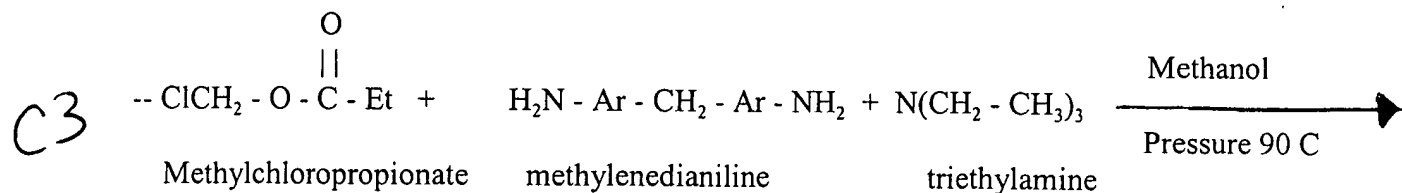
C² Hereinafter the invention will be described according to the process stages to obtain the polyglycolyl urea hydantoin as well as its use, main objection of the application, in the manufacturing of H-class magnet-wire with improved properties.

The process to obtain polyglycolyl urea hydantoin PGU is divided in main stages: A and B.

Please amend Page 3, line 14 and, as follows:

- C³
- 4) loading methyl isocyanate, diglycinate, solvents and catalyst in the polymerization reactor,
 - 5) obtaining polyglycolyl urea hydantoin resin;

Page 4, cancel the three lines under "Path 2: nucleophilic shift" and replace with the following:



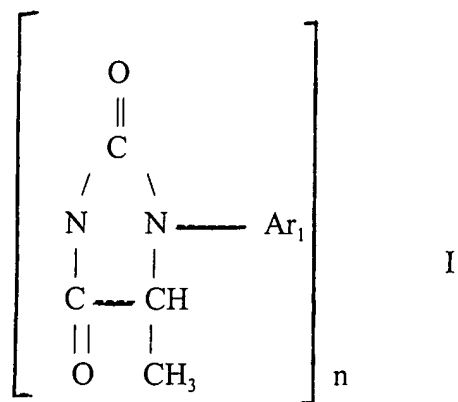
Please change Page 5, line 12 as follows:

a) in a glass or stainless steel matrass, provided with stirring means, reflux column, heating and

cooling systems, the following materials are added:

methylenedianiline, methanol and methyl bromopropionate. A C₁ - C₄ aliphatic solvent may be used.

Page 7, after line 6, delete the formula and replace it with the following:



IN THE CLAIMS

- 6) A process for obtaining urea hydantoin resin from aromatic diglycinates for insulating electric conductor, in the absence of HCN polluting residues, comprising the following steps:

a) reacting a mixture of methylhaloester and methylenedianiline in a C₁ - C₄ aliphatic

solvent under reflux conditions at atmospheric pressure and up to solvent reflux temperature, wherein said methylhaloester is selected from the group consisting of methyl-bromopropionate and methylchloropropionate;.

b) adding a catalyst to the reaction mixture to obtain diglycinate in solution;

c) separating the solvent through atmospheric distillation;

d) crystallizing the diglycinate;

e) filtering and purifying the diglycinate by washing with water;

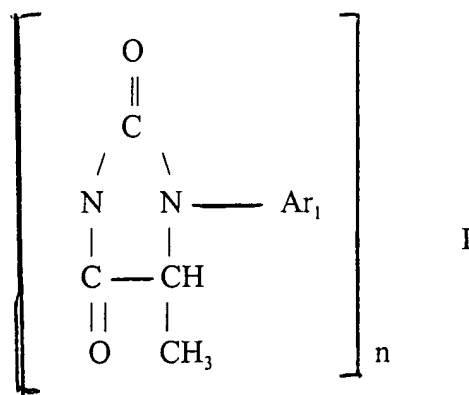
f) drying the methyl diglycinate obtained;

g) reacting the obtained diglycinate with cresylic acid in a reactor until solution is complete;

h) stirring the diglycinate with a methylene diisocyanate, solvent and catalyst;

i) distilling and then cooling the reaction product; and

j) recovering the urea hydantoin resin having the formula:



where Ar₁ is a substituted aromatic compound or a substituted diphenylalkyl, and

C5
cont. 2 < n < 500..

C6 9) The process according to claim 6, wherein the mixture reflux is conducted for 19 hours.

14) The process according to claim 6, wherein the methylene diisocyanate is stirred at a temperature of 60 C.

C7 15) The process according to claim 6, further comprising adding triethylenediamine or 1,4 diazobicyclo (2,2,2) octane catalyzer after step h, at a temperature of up to 180C.

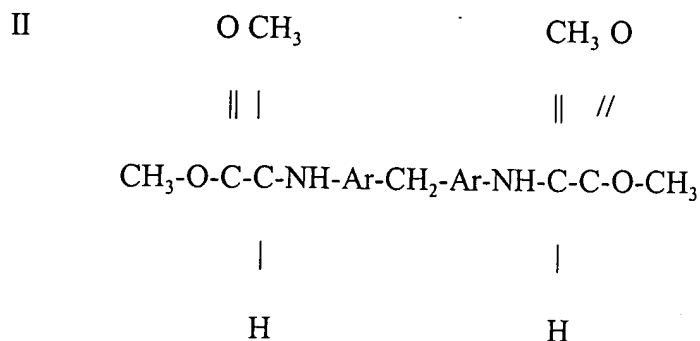
16) The process according to claim 15, further comprising performing distillation at a temperature of 200 C.

C8 18) The process according to claim 6 wherein the product has a viscosity of 44 to 47 seconds at 25 C, as determined in a No. 4 Ford Cup on a polymer sample..

C9 20) The process according to claim 6 wherein the polyglycolyl urea hydantoin obtained has a viscosity (Cp) of 4,800 at 15% solids at 70 C.

C10 23) The process according to claim 6, wherein the methyl methyl diglycinate obtained is

dried with hot air at 40 C and corresponds to a stereoisomer mixture with a melting point of 95-116 C, of the following formula II:



IN THE ABSTRACT

A process for obtaining polyglycolyl urea from aromatic diglycinate to insulate electr electric conductors without forming HCN polluting residues is taught by using a mixture of methylene bromopropionate and methylenedianiline in aliphatic solvents in the presence of a catalyst. The solvent is separated through distillation and filtration of the mother waters and purification through washing with water. The resulting product is mixed with cresyl acid and methylene diisocyanate in the presence of a triethylenediamino catalyzer, and is then heated and distilled to obtain a polyglycolyl urea hydantoin resin.